

# **Characterization of Natural Hydrate Bearing Core Samples**

## **Monthly Report for August 2003**

### **Task 1: IR Imaging Analyses**

IR thermal anomalies from Leg 204 have been depth shifted to curated core depth. The process for the depth shift was performed for one hole independently at Scripps and at PNNL with results being essentially identical. The depth shift were mostly less than a meter but completing this task is critical to completing the statistical analysis of IR data, particularly the comparison to factors such as percent sand which directly control gas hydrate occurrence.

### **Task 2: Core Sample Characterization Testing**

Manufacturing of our pressure vessel for resonant ultrasound spectroscopy measurements was delayed. Receipt is now expected in early September.

### **Task 3. Hydrate Dissociation Kinetics**

Additional editing and approval to publish from the Mallik Science Team was received for an article on gas hydrate research at PNNL for the *Fire & Ice* newsletter. The story was well-received and should appear in the next issue.

Core samples from the Mallik 5L-38 well were studied under methane and nitrogen gas atmospheres in an environmental scanning electron microscope (ESEM) equipped with a cryostage, video recorder, and mass spectrometer. Hydrate and water ice formation and dissociation were imaged while simultaneously collecting gas samples for analysis. Hydrate crystals appeared to grow epitaxially under a methane atmosphere in the ESEM whereas only loosely agglomerated water ice crystallites were observed under a N<sub>2</sub> gas atmosphere. The peak rate of gas hydrate dissociation in Mallik sediment samples occurred at  $-56 \pm 2^\circ\text{C}$  whereas the peak rate was at  $-37^\circ\text{C}$  for an artificial methane hydrate sample synthesized from crushed ice. A paper entitled "Characterization of Mallik 5L-38 core samples in the environmental scanning electron microscope," by B. P. McGrail, J. S. Young, P. F. Martin, and M. L. Alexander was submitted for inclusion in the Mallik compendium volume.

### **Significant Issues and Corrective Action**

None.

